(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号
特開2002－181203
（P2002－181203A）
(43)公開日　平成14年６月26日(2002.6.26)

(51)Int.Cl.⁷	識別記号	Ｆ Ｉ		テーマコード（参考）
Ｆ１６Ｋ　1/226		Ｆ１６Ｋ　1/226	Ｄ	３Ｈ０５２
Ｆ１６Ｃ　33/74		Ｆ１６Ｃ　33/74	Ｚ	３Ｊ０１６
Ｆ１６Ｊ　15/16		Ｆ１６Ｊ　15/16	Ｂ	３Ｊ０４３

審査請求　未請求　請求項の数１　ＯＬ　（全４頁）

(21)出願番号　特願2000－381552(P2000－381552)

(22)出願日　平成12年12月15日(2000.12.15)

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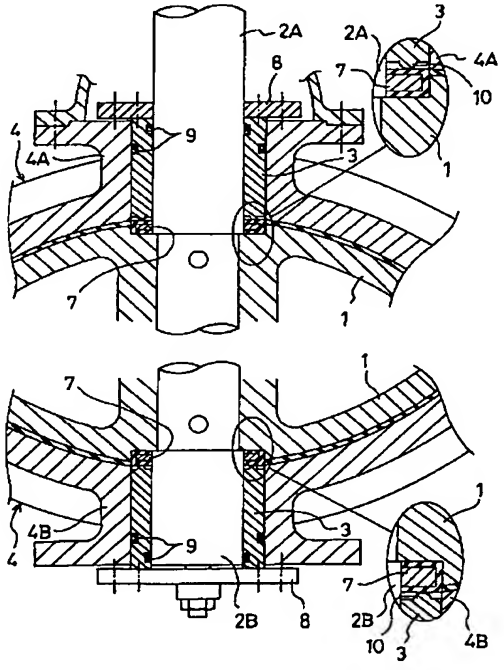
Ｆターム(参考)　3H052 AA02 BA02 BA22 CA23 CA26 CD03
3J016 AA02 BB02
3J043 AA17 BA02 CA08 CB13 CB30

(54)【発明の名称】　バタフライ弁の軸受部のシール構造

(57)【要約】
【課題】　弁体の開閉頻度が高くなり過ぎたとしても、流体もれ封止機能が低下するのを十分に遅らせて、耐久性を向上させることができるばかりか、組立やメンテナンスに際する慎重度を緩和することができるバタフライ弁の軸受部のシール構造を提供する。
【解決手段】　上側弁棒２Ａに対応する筒状軸受３の下端と下側弁棒２Ｂに対応する筒状軸受３の上端に、略半円形断面を呈する環状の突起１０を設け、この環状の突起１０を、金属製の弁体シールリング７を覆っているゴムライニング層１１に押圧して、流体もれを封止するように構成する。



PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-181203
(43)Date of publication of application : 26.06.2002

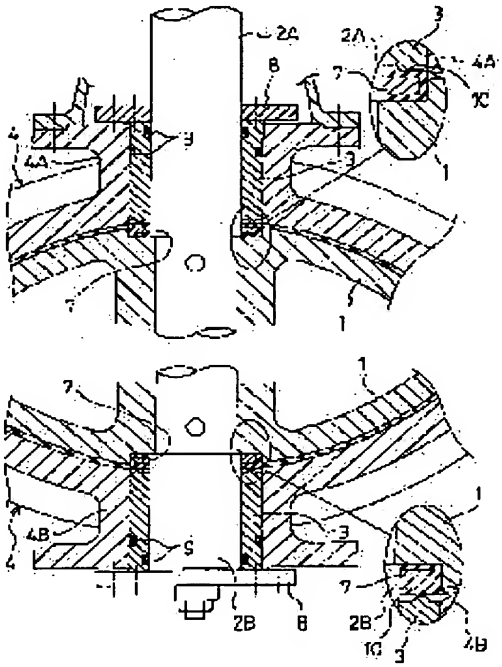
(51)Int.Cl. F16K 1/226
F16C 33/74
F16J 15/16

(21)Application number : 2000-381552
(22)Date of filing : 15.12.2000

(71)Applicant : KUBOTA CORP
(72)Inventor : MURAKAMI MOTOAKI

(54) SEAL STRUCTURE OF BEARING PART OF BUTTERFLY VALVE

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a seal structure of the bearing part of a butterfly valve which not only can improve durability by sufficiently delaying lowering of a fluid leak sealing function even when the opening/closing frequency of a valve element is excessively increased but also can relax the degree of prudence in assembly and maintenance.
SOLUTION: Annular protrusions 10 approximately in a semicircular in cross section are formed on the lower end of a cylindrical bearing 3 corresponding to an upper valve rod 2A and the upper end of the cylindrical bearing 3 corresponding to a lower valve rod 2B. By pressing the annular protrusions 10 against a rubber lining layer 11 by which a valve element seal ring 7 made of a metal is covered, leakage of fluid is closed.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] A mounting beam valve rod is supported to revolve by bearing of a valve box free [a revolution] through tubed bearing simultaneously pivotable in a valve element. In the seal structure of bearing of the butterfly valve constituted so that the inner edge of said tubed bearing might be pressed to the valve element seal ring built into said valve element and the leak of a fluid might be closed Seal structure of bearing of the butterfly valve characterized by preparing the projection which projects towards said valve element seal ring in the inner edge of said tubed bearing, and this projection being pressed by said valve element seal ring through an elastic layer.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention is made into the seal structure of bearing of a butterfly valve.
[0002]
[Description of the Prior Art] What is shown in drawing 5 is known as seal structure of bearing of the conventional butterfly valve. As for this seal structure, mounting beam upside valve rod 2A and bottom valve rod 2B are supported to revolve by the bearings 4A and 4B of a valve box 4 free [a revolution] through the metal tubed bearing 3 simultaneously pivotable in the valve element 1. That is, upside valve rod 2A is supported to revolve by upper bearing 4A free [a revolution] through the tubed bearing 3, and bottom valve rod 2B is supported to revolve by lower bearing 4B free [a revolution] through the tubed bearing 3.

[0003] The seal member 5 formed by elastic material, such as rubber, is attached outside the soffit section of the tubed bearing 3 corresponding to upside valve rod 2A, and the seal member 5 formed also in the upper bed section of the tubed bearing 3 corresponding to bottom valve rod 2B by elastic material, such as rubber, is attached outside it. This seal member 5 is equipped with the 1st ring section 50, and the 2nd ring section 51 and two ribs 52 and 52 of a circumferencial direction which the 1st ring section 50 and the 2nd ring section 51 are made to follow by two places as shown in drawing 6 . While fitting into the seal member fitting slot 6 formed in the soffit section of the tubed bearing 3 by the side of upside valve rod 2A, and the upper bed section of the tubed bearing 3 by the side of bottom valve rod 2B like drawing 5 and being attached in each tubed bearing 3 and 3, the 2nd ring section 51 is made to have projected slightly from the inner edge of the tubed bearing 3 and 3.
[0004] On the other hand, the metal valve element seal rings 7 and 7 are built into the both ends of the valve rod shaft orientations in a valve element 2, and making the inner edge of the tubed bearing 3 and 3 press to these valve element seal rings 7 and 7, and by making the 2nd ring section 51 of the seal member 5 which projects slightly from the inner edge of the tubed bearing 3 and 3 in detail press, it is constituted so that a fluid leak may be closed. In addition, press of the 2nd ring section 51 to the valve element seal rings 7 and 7 arranges the annular pressure plate 8 to the outer edge of the bearings 4A and 4B in a valve box 4, concludes this presser-foot plate 8 to Bearings 4A and 4B with a bolt (graphic display abbreviation), and is obtained by pressing the tubed bearing 3 and 3. Nine in drawing shows an O ring.
[0005]
[Problem(s) to be Solved by the Invention] However, with the seal structure of bearing of the butterfly valve of said configuration, since the 2nd ring section 51 which becomes by elastic material, such as rubber, to the metal valve element seal ring 7 carries out line contact and forms the linear closure line, a large load will be applied to the 2nd ring section 51. For this reason, when the switching frequency of a valve element 1 becomes high too much, there is a possibility that the 2nd ring section 51 may carry out wear breakage, and the closure function of a fluid leak may fall. Moreover, since the 2nd ring section 51 projects slightly from the inner edge of the tubed bearing 3 and 3, when dealing with the tubed bearing 3 and 3 on the occasion of assembly, a maintenance, etc. of a butterfly valve, it has a possibility that the 2nd ring section 51 may be collided and damaged in other metal members. For this reason, it is required that assembly, a maintenance, etc. should be performed much more carefully.
[0006] Then, this invention aims at offering the seal structure of bearing of the butterfly valve which can ease whenever [which fully delays that a fluid leak closure function falls, and faces it about / that endurance can be raised /, assembly, and a maintenance / prudent], even if the switching frequency of a valve element becomes high too much.
[0007]
[Means for Solving the Problem] In order to attain said object, the seal structure of bearing of the butterfly valve concerning this invention A mounting beam valve rod is supported to revolve by bearing of a valve box free [a revolution] through tubed bearing simultaneously pivotable in a valve element. In the seal structure of bearing of the butterfly valve constituted so that the inner edge of said tubed bearing might be pressed to the valve element seal ring built into said valve element and the leak of a fluid might be closed The projection which projects towards said valve element seal ring is prepared in the inner edge of said tubed bearing, and it is characterized by this projection being pressed by said valve element seal ring through an elastic layer.
[0008] Since the projection prepared in the inner edge of tubed bearing is pressed by the elastic layer according to this invention, an elastic layer can form the closure line of the shape of a field which carried out field contact, and can distribute the load concerning an elastic layer. For this reason, even if the switching frequency of a valve element becomes high too much, the wear breakage on an elastic layer can be suppressed, it can fully delay that a fluid leak closure function falls, and endurance can be raised. Moreover, when tubed bearing was dealt with, even if it collided with other metal members on the occasion of assembly, a maintenance, etc. of a butterfly valve, the projection prepared in the inner edge of tubed bearing is not damaged. Therefore, whenever [which faces assembly and a maintenance / prudent] can also be eased.
[0009]
[Embodiment of the Invention] Hereafter, the gestalt of 1 operation of this invention is explained based on a drawing. Drawing 1 is the sectional view showing selectively the butterfly valve which applied this invention. In addition, the same sign is attached

and explained to the same part as said conventional example.
[0010] In drawing 1 , mounting beam upside valve rod 2A and bottom valve rod 2B are supported to revolve by the bearings 4A and 4B of a valve box 4 free [a revolution] through the metal tubed bearing 3 simultaneously pivotable in the valve element 1. That is, upside valve rod 2A is supported to revolve by upper bearing 4A free [a revolution] through the tubed bearing 3, and bottom valve rod 2B is supported to revolve by lower bearing 4B free [a revolution] through the tubed bearing 3.
[0011] The annular projection 10 which projects towards the upper valve element seal ring 7 is formed in the soffit of the tubed bearing 3 corresponding to upside valve rod 2A, and the annular projection 10 which projects towards the upper valve element seal ring 7 is formed in the upper bed of the tubed bearing 3 corresponding to bottom valve rod 2B. This annular projection 10 presents an abbreviation semicircle cross section, and projects slightly from the soffit or upper bed of the tubed bearing 3.
[0012] On the other hand, the metal valve element seal ring 7 is built into the both ends of the valve rod shaft orientations in a valve element 2. As this valve element seal ring 7 is shown in drawing 2 , the third page of those vertical both sides and outside surfaces is covered with the rubber lining layer (elastic layer) 11. Therefore, by making the annular projection 10 prepared in the tubed bearing 3 and 3 to the rubber lining layer 11 press, it is constituted so that a fluid leak may be closed. In addition, press of the annular projection 10 to the rubber lining layer 11 arranges the annular pressure plate 8 to the outer edge of the bearings 4A and 4B in a valve box 4, concludes this presser-foot plate 8 to Bearings 4A and 4B with a bolt (graphic display abbreviation), and is obtained by pressing the tubed bearing 3 and 3. Nine in drawing shows an O ring.
[0013] Thus, the annular projection 10 prepared in the soffit of the tubed bearing 3 corresponding to upside valve rod 2A is pressed by the rubber lining layer 11 of the upper valve element seal ring 7. If it is the configuration that the annular projection 10 prepared in the soffit of the tubed bearing 3 corresponding to bottom valve rod 2B is pressed by the rubber lining layer 11 of the lower valve element seal ring 7 The rubber lining layer 11 can form the closure line of the shape of a field which carried out field contact, and can distribute the load concerning the rubber lining layer 11. For this reason, though the switching frequency of a valve element 1 becomes high too much, the wear breakage on the rubber lining layer 11 can be suppressed, it can fully delay that a fluid leak closure function falls, and endurance can be raised. Moreover, when dealing with the tubed bearing 3 and 3, even if it collides with other metal members on the occasion of assembly, a maintenance, etc. of a butterfly valve, the annular projection 11 is not damaged. Therefore, whenever [which faces assembly and a maintenance / prudent] can be eased as compared with the conventional example.
[0014] In addition, although the third page of vertical both sides and an outside surface is using the valve element seal ring 7 covered with the rubber lining layer 11 with the gestalt of said operation As are shown in drawing 3 and it is shown in the valve element seal ring 7 or drawing 4 of the structure where the second page, the field where the annular projection 10 is pressed, and an outside surface, was covered with the rubber lining layer 11 Even if it is the valve element seal ring 7 of the structure where only the whole surface by which the annular projection 10 is pressed was covered with the rubber lining layer 11, the same operation and effectiveness as the gestalt of said operation can be done so.
[0015]
[Effect of the Invention] Since the seal structure of bearing of the butterfly valve of this invention is constituted as explained above, the effectiveness according to following ranks is done so.
[0016] That is, since an elastic layer can distribute the load which forms the closure line of the shape of a field which carried out field contact, and is applied to an elastic layer, though the switching frequency of a valve element becomes high too much, the wear breakage on an elastic layer can be suppressed, it can fully delay that a fluid leak closure function falls, and endurance can be raised. Moreover, a projection is not damaged even if it collides with other metal members on the occasion of assembly, a maintenance, etc. of a butterfly valve, when dealing with tubed bearing. Therefore, whenever [which faces assembly and a maintenance / prudent] can be eased as compared with the conventional example.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention is made into the seal structure of bearing of a butterfly valve.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] What is shown in drawing 5 is known as seal structure of bearing of the conventional butterfly valve. As for this seal structure, mounting beam upside valve rod 2A and bottom valve rod 2B are supported to revolve by the bearings 4A and 4B of a valve box 4 free [a revolution] through the metal tubed bearing 3 simultaneously pivotable in the valve element 1. That is, upside valve rod 2A is supported to revolve by upper bearing 4A free [a revolution] through the tubed bearing 3, and bottom valve rod 2B is supported to revolve by lower bearing 4B free [a revolution] through the tubed bearing 3.

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[0004] On the other hand, the metal valve element seal rings 7 and 7 are built into the both ends of the valve rod shaft orientations in a valve element 2, and making the inner edge of the tubed bearing 3 and 3 press to these valve element seal rings 7 and 7, and by making the 2nd ring section 51 of the seal member 5 which projects slightly from the inner edge of the tubed bearing 3 and 3 in detail press, it is constituted so that a fluid leak may be closed. In addition, press of the 2nd ring section 51 to the valve element seal rings 7 and 7 arranges the annular pressure plate 8 to the outer edge of the bearings 4A and 4B in a valve box 4, concludes this presser-foot plate 8 to Bearings 4A and 4B with a bolt (graphic display abbreviation), and is obtained by pressing the tubed bearing 3 and 3. Nine in drawing shows an O ring.

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EFFECT OF THE INVENTION

[Effect of the Invention] Since the seal structure of bearing of the butterfly valve of this invention is constituted as explained above, the effectiveness according to following ranks is done so.
[0016] That is, since an elastic layer can distribute the load which forms the closure line of the shape of a field which carried out field contact, and is applied to an elastic layer, though the switching frequency of a valve element becomes high too much, the wear breakage on an elastic layer can be suppressed, it can fully delay that a fluid leak closure function falls, and endurance can be raised. Moreover, a projection is not damaged even if it collides with other metal members on the occasion of assembly, a maintenance, etc. of a butterfly valve, when dealing with tubed bearing. Therefore, whenever [which faces assembly and a maintenance / prudent] can be eased as compared with the conventional example.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, with the seal structure of bearing of the butterfly valve of said configuration, since the 2nd ring section 51 which becomes by elastic material, such as rubber, to the metal valve element seal ring 7 carries out line contact and forms the linear closure line, a large load will be applied to the 2nd ring section 51. For this reason, when the switching frequency of a valve element 1 becomes high too much, there is a possibility that the 2nd ring section 51 may carry out wear breakage, and the closure function of a fluid leak may fall. Moreover, since the 2nd ring section 51 projects slightly from the inner edge of the tubed bearing 3 and 3, when dealing with the tubed bearing 3 and 3 on the occasion of assembly, a maintenance, etc. of a butterfly valve, it has a possibility that the 2nd ring section 51 may be collided and damaged in other metal members. For this reason, it is required that assembly, a maintenance, etc. should be performed much more carefully.
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MEANS

[Means for Solving the Problem] In order to attain said object, the seal structure of bearing of the butterfly valve concerning this invention A mounting beam valve rod is supported to revolve by bearing of a valve box free [a revolution] through tubed bearing simultaneously pivotable in a valve element. In the seal structure of bearing of the butterfly valve constituted so that the inner edge of said tubed bearing might be pressed to the valve element seal ring built into said valve element and the leak of a fluid might be closed The projection which projects towards said valve element seal ring is prepared in the inner edge of said tubed bearing, and it is characterized by this projection being pressed by said valve element seal ring through an elastic layer.
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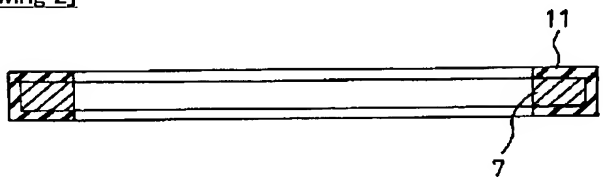
DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the sectional view showing selectively the butterfly valve which applied this invention.
[Drawing 2] It is the expanded sectional view showing an example of a valve element seal ring.
[Drawing 3] It is the expanded sectional view showing other examples of a valve element seal ring.
[Drawing 4] It is the expanded sectional view showing the example from which a valve element seal ring differs further.
[Drawing 5] It is the sectional view showing the butterfly valve of structure selectively conventionally.
[Drawing 6] It is the amplification perspective view of a seal member.
[Description of Notations]
1 Valve Element
2 Valve Rod
3 Tubed Bearing
4 Valve Box
7 Valve Element Seal Ring
10 Projection
11 Rubber Lining Layer (Elastic Layer)

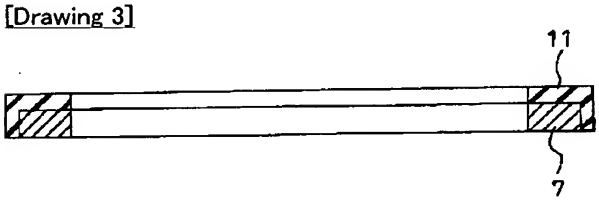
[Translation done.]

DRAWINGS

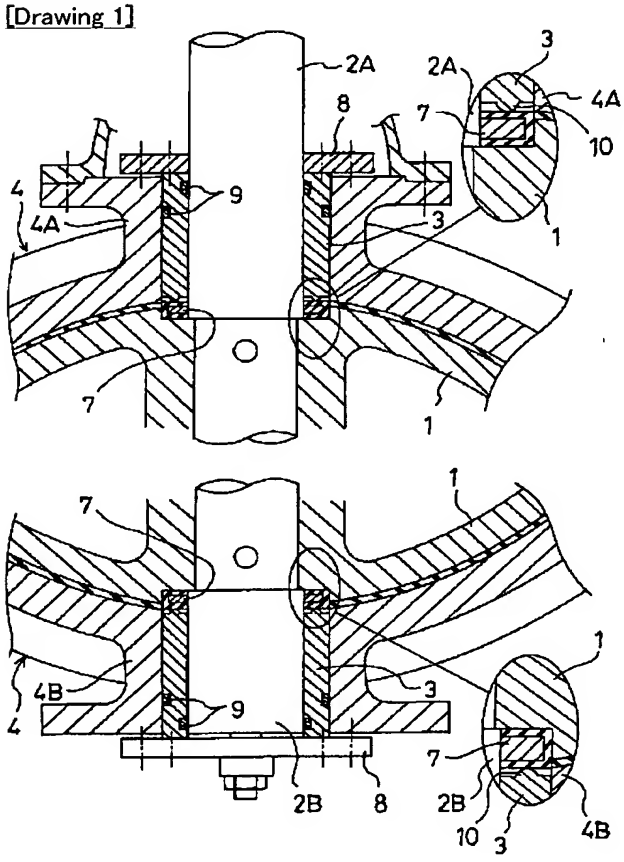
[Drawing 2]



[Drawing 3]



[Drawing 1]



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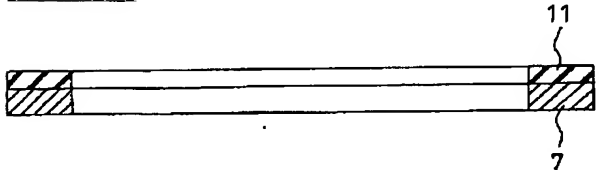
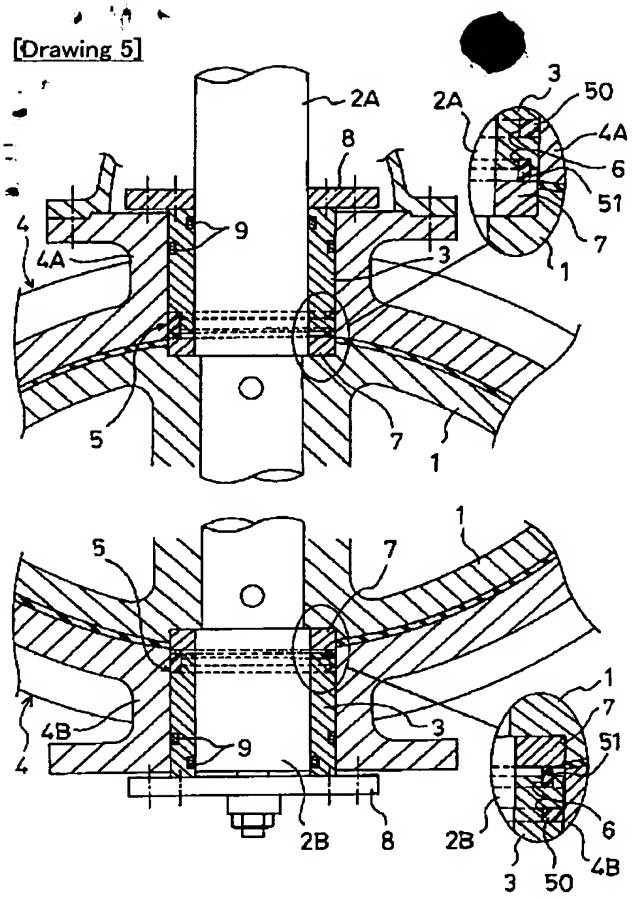
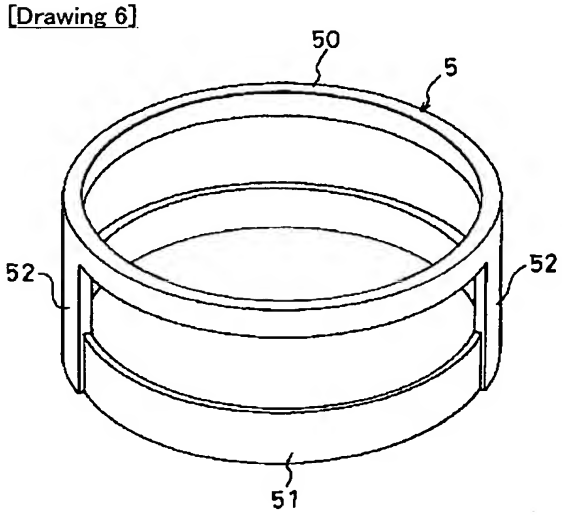


[Drawing 5]



[Drawing 6]



[Translation done.]